

**Principal Cool Season Turfgrass Weed Species****Summer Annual Grasses**

*Digitaria ischaemum* / *D. sanguinalis*  
*Echinochloa crusgalli*  
*Eleusine indica*  
*Panicum capillare*  
*Setaria pumila*

Smooth Crabgrass / Large Crabgrass  
 Barnyard Grass  
 Goosegrass  
 Witchgrass  
 Yellow Foxtail

**Winter Annual Grasses**

*Poa annua*  
*Bromus tectorum*

Annual Bluegrass  
 Downy Brome

**Perennial Grasses**

*Bromus inermis*  
*Dactylis glomerata*  
*Elytrigia repens*  
*Muhlenbergia schreberi*  
*Paspalum dilatatum*  
*Paspalum leave*  
*Phleum pratense*  
*Sorghum halepense*

Smooth Brome  
 Orchardgrass  
 Quackgrass  
 Nimblewill  
 Dallisgrass  
 Field Paspalum  
 Timothy  
 Johnsongrass

**Sedges (Grass-like)**

*Cyperus esculentus*

Yellow Nutsedge

**Summer Annual Broadleaves**

*Amaranthus blitoides*  
*Euphorbia supina*  
*Lactuca scariola*  
*Malva rotundifolia*  
*Medicago lupulina*  
*Mollugo verticillata*  
*Oxalis stricta*  
*Polygonum aviculare*  
*Portulaca oleracea*

Prostrate Pigweed  
 Prostrate Spurge  
 Prickly Lettuce  
 Common Mallow  
 Black Medic  
 Carpetweed  
 Yellow Woodsorrel  
 Prostrate Knotweed  
 Purslane

**Winter Annual Broadleaves**

*Cardamine hirsuta*  
*Lamium amplexicaule*  
*Lamium purpureum*  
*Stellaria media*

Hairy Bittercress  
 Henbit  
 Purple Deadnettle  
 Common Chickweed

**Perennial Broadleaves**

*Achillea millefolium*  
*Cerastium vulgatum*  
*Chicorium intybus*  
*Cirsium arvense* (Biennial)  
*Glecoma hederacea*  
*Plantago lanceolata*  
*Plantago rugelii*  
*Rumex crispus*  
*Taraxacum officinale*  
*Trifolium repens*  
*Viola papilionacea*

Yarrow  
 Mouse-ear Chickweed  
 Chicory  
 Canada Thistle  
 Creeping Charlie  
 Buckhorn Plantain  
 Blackseed Plantain  
 Curly Dock  
 Dandelion  
 White Clover  
 Wild Violet

## Annual Grass Weeds

Species	Growth Habit	Vernation	Ligule	Auricle	Sheath	Lamina	Inflorescence
<b>Annual Bluegrass</b> <i>Poa annua</i>	Bunch type. May have stolons	Folded	Tall, membranous	Absent	Round, smooth, overlapping	Boat shaped leaf tip	Distinct panicle. Prolific.
<b>Smooth Crabgrass</b> <i>Digitaria ischaemum</i>	Bunch Type. Decumbent stems that root at nodes	Rolled	Tall, rounded, membranous	Absent	Compressed, smooth, may be tinged in purple	Wide, tapers to point. Slightly pubescent near ligule	Distinct spikelet with 2-6 branch-like fingers
<b>Large Crabgrass</b> <i>Digitaria sanguinalis</i>	Bunch Type. Decumbent stems that root at nodes	Rolled	Tall, jagged edges, membranous	Absent	Compressed, hairy	Wide, tapers to point. Glabrous to slightly pubescent	Distinct spikelet with 3-13 branch-like fingers
<b>Barnyard Grass</b> <i>Echinochloa crusgalli</i>	Bunch Type. Lower stems decumbent, upper ascending	Rolled	Absent	Absent	Glabrous, pyramidal shape. Green-purple color	Smooth, wide, soft, variable, pubescent	Distinct panicle
<b>Goosegrass</b> <i>Eleusine indica</i>	Bunch Type. Decumbent stems, upper stems can be ascending	Folded	Ciliate membrane	Absent	Smooth, loose, overlapping, very compressed	Smooth, tough	Distinct, coarse, spikelet with 2-10 branch-like fingers
<b>Witchgrass</b> <i>Panicum capillare</i>	Bunch Type	Rolled	Fringe of short hairs	Absent	Pubescent	Soft, flat, wide, with broad midrib. Densely pubescent	Distinct, very open, long, fine panicle
<b>Yellow Foxtail</b> <i>Setaria pumila</i>	Bunch Type. Erect or decumbent stems	Rolled	Fringe of short hairs	Absent	Pubescent at margins	Flat, wide, smooth. Margins are barbed	Distinct, dense cylindrical panicle



Primary ID Characteristic

## Summer Annual Grass Weeds



**Sanbur – *Cenchrus pauciflorus***



**Smooth Crabgrass – *Digitaria ischaemum***  
(Germinates when soil temperatures reach 58°F)



**Large Crabgrass – *Digitaria sanguinalis***  
(Germinates when soil temp reach the upper 60's)



**Barnyardgrass – *Echinochloa crusgalli***  
(Ligule is absent)



**Goosegrass – *Eleusine indica***  
(Silvery crown and multiple florets per spikelet)



**Lovegrass – *Eragrostis pilosa***

## Summer Annual Grass Weeds



**Yellow Foxtail – *Setaria pumila***



**Green Foxtail – *Setaria viridis***

## Winter Annual Grass Weeds



**Annual bluegrass – *Poa annua***



**Downy Brome – *Bromus tectorum***

## Perennial Grass Weeds

Species	Growth Habit	Vernation	Ligule	Auricle	Sheath	Lamina	Inflorescence
<b>Smooth Brome</b> <i>Bromus inermis</i>	Strongly rhizomatous	Rolled	Short, membranous	Absent	Round, distinctly closed near top	Wide, blue-green color. Often with "Watermark"	Panicle
<b>Orchard-grass</b> <i>Dactylis glomerata</i>	Bunch Type	Folded	Distinct, long, membranous Often toothed	Absent	Compressed and closed at base	Wide, tapers to acute point. Furrowed at midrib	Panicle
<b>Quackgrass</b> <i>Elytrigia repens</i>	Erect stems. Strongly rhizomatous	Rolled	Short, membranous	Distinct, long, and clasping	Lower is pubescent, upper is hairy	Sharply pointed. Gray-green color, sparsely pubescent	Spike with 4-7 flattened spikelets
<b>Nimblewill</b> <i>Muhlenbergia schreberi</i>	Stoloniferous Roots at lower nodes	Folded	Short, membranous	Absent	Mostly glabrous, loose, open at stem	Short, flat, narrow, pointed	Slender panicle, often present, distinct
<b>Field Paspalum</b> <i>Paspalum laeve</i>	Rhizomatous	Rolled	Tall, membranous with hairs	Absent	Can be rough, hairy at base	Rough margins, with prominent white midrib	Spike with alternating spikelets
<b>Timothy</b> <i>Phleum pratense</i>	Bunch Type Lower internodes form haplocorm (enlarged bulb)	Rolled	Membranous	Absent	Round, smooth, overlapping	Long, flat, blue-green color, tapered, scabrous at margins	Dense Panicle
<b>Rough Bluegrass</b> <i>Poa trivialis</i>	Stoloniferous	Folded	Distinct, membranous	Absent	Round, distinctly closed near top. Senescing sheaths resemble onion skin	Boat shaped leaf tip	Panicle
<b>Johnson-grass</b> <i>Sorghum halepense</i>	Strongly rhizomatous	Rolled	Distinct, membranous, notched with hairs	Absent		Rough margins, with prominent white midrib	Large open Panicle, often purple

## Perennial Grass Weeds



**Orchardgrass – *Dactylis glomerata***



**Quackgrass – *Elytrigia repens***



**Nimblewill – *Muhlenbergia shreberi***



**Field Paspalum – *Paspalum laeve***



**Timothy – *Phleum pratense***



**Johnsongrass – *Sorghum halepense***

## Sedges



**Yellow Nutsedge**



**False Green Kyllinga**

Species	Growth Habit	Vernation	Lamina	Inflorescence
<b>Yellow Nutsedge</b> <i>Cyperus esculentus</i>	Erect stems. Strongly rhizomatous. Tubers.	Leaves in 3 vertical rows. Stems are triangular in cross section	Greenish-yellow color	Spikes. Each flower in the axil of a single bract (the glume)
<b>False Green Kyllinga</b> <i>Kyllinga brevifolia</i>	Strongly rhizomatous. Forms dense mats in turf. No tubers.	Leaves in 3 vertical rows. Stems are triangular in cross section	Green. Narrower compared to yellow nutsedge	Globular inflorescence. Each flower in the axil of a single bract

## Other Monocotyledonous Weeds



**Wild Garlic – *Allium vineale***  
**Wild Onion – *A. canadense***  
 (Garlic has hollow leaves, onion has flat leaves)



**Spring Beauty – *Claytonia virginica***  
 (White flowers with 5 petals. Leaves have a distinct, grooved midrib)

## Annual Broadleaf Weeds

Species	Life Cycle	Stem	Root	Leaves	Flowers
<b>Prostrate Pigweed</b> <i>Amaranthus blitoides</i>	Summer Annual. Reproduces by seed	Prostrate, fleshy, smooth stems radiate from root. Reddish-purple color	Taproot	Small, simple, egg shaped, broader and blunt with notch at tip, alternate	Inconspicuous, borne in compact clusters at leaf axil
<b>Prostrate Spurge</b> <i>Euphorbia supina</i>	Summer Annual. Reproduces by seed in early summer. Continues to germinate through summer	Prostrate, radiate from root. Long-branched, red-purple color, milky sap	Taproot	Asymmetrical, red-purple, simple, ovate, slightly pubescent. Milky sap	Inconspicuous in axil of leaves
<b>Common Mallow</b> <i>Malva rotundifolia</i>	Summer Annual. Reproduces by seed	Semi-prostrate. Radiate from long taproot	Long taproot	Nearly round in leaf axil. Borne on short pedicles	White petaled flowers
<b>Black Medic</b> <i>Medicago lupulina</i>	Annual. Reproduces by seed	Decumbent, long, pubescent	Strong, central taproot	Trifoliolate with stipules at base of petiole. Prominent veins. Clover-like leaf but terminal leaflet not sessile.	Small, yellow on flower stalks arising from leaf axil
<b>Yellow Woodsorrel</b> <i>Oxalis stricta</i>	Summer Annual (North). Perennial (South). Reproduces by seed. Germinates in late spring and all through summer	Slender, prostrate or ascending roots	Fibrous, shallow	Trifoliolate, heart-shaped leaflets. Alternate, long petioles, light-green color	5-Petaled, yellow, trumpet-like flowers
<b>Prostrate Knotweed</b> <i>Polygonum aviculare</i>	Summer Annual. Reproduces by seed early in spring. Common in compacted areas.	Prostrate, multi-branched, radiate from root, wiry	Thin, long taproot	Oblong to linear shaped, blue-green color, alternate, symmetrical	Inconspicuous, in axil of leaves. Small, yellow or white
<b>Purslane</b> <i>Portulaca oleracea</i>	Summer Annual. Reproduces by seed	Prostrate, fleshy, smooth, shallow	Fibrous	Succulent, obovate, alternate reddish color	Yellow flowers, sessile in leaf axil or clustered
<b>Henbit</b> <i>Lamium amplexicaule</i>	Winter Annual. Reproduces by seed	Smooth, 4-sided ascending or prostrate. Branched at base	Shallow, fibrous	Rounded, opposite upper leaves joined on stalk	Borne in leaf axil
<b>Common Chickweed</b> <i>Stellaria media</i>	Winter Annual. Reproduces by seed. Found in shade	Weak, trailing, multi-branched. Roots at nodes	Fibrous	Ovate, round at base, pointed at tip. Glabrous, upper leaves sessile, opposite	Small, white, 5 petals which are deeply notched. Green sepals which are larger than petals



## Annual Broadleaf Weeds



**Black medic - *Medicago lupulina***  
(Stem on end leaf distinguishes from white clover)



**Mallow - *Malva rotundifolia***  
(Has a central taproot and does not root at the nodes)



**Corn Speedwell – *Veronica arvensis***



**Knotweed - *Polygonum aviculare***  
(Sometimes confused with crabgrass when first emerging)



**Lambsquarters – *Chenopodium album***



**Virginia Pepperweed – *Lepidium virginicum***

## Summer Annual Broadleaf Weeds



**Pigweed - *Amaranthus blitoides***  
(May have reddish stem and taproot)



**Purslane - *Portulaca oleracea***  
(Fleshy leaves)



**Spurge - *Euphorbia supina***  
(Milky sap distinguishes from knotweed)



**Oxalis (Yellow Woodsorrel) - *Oxalis stricta***  
(Heart-shaped leaves)



**Carpetweed - *Mollugo verticillata***



**Pineappleweed - *Matricaria matricarioides***

## Winter Annual Broadleaf Weeds



**Common Chickweed - *Stellaria media***  
(Glabrous leaves.)



**Common Groundsel – *Senecio vulgaris***



**Henbit - *Lamium amplexicaule***  
(Square stems. Terminal leaves attached directly to main stem. Lower leaves on short branches)



**Hairy Bittercress – *Cardamine hirsuita***



**Purple Deadnettle – *Lamium purpureum***



**Spiny Sowthistle – *Sonchus oleraceus***

## Perennial Broadleaf Weeds

Species	Life Cycle	Stem	Root	Leaves	Flowers
<b>Mouse ear Chickweed</b>  <i>Cerastium vulgatum</i>	Perennial. Reproduces by seed. Also by rooting on creeping stems	Pubescent, creeping. Spreading to erect roots at nodes	Fibrous, shallow	Simple, lanceolate, sessile, pubescent with hairs opposite	Small, white, 5-petaled flowers notched at tip
<b>Canada Thistle</b>  <i>Cirsium arvense</i>	Perennial. Reproduces by seed and by creeping roots which sprout	Hollow, branched.	Fibrous, extensive, fleshy. Sends up new shoots frequently	Oblong to lance-shaped, wavy, bright, light-green. Notched to notchless, spiny to spineless, margins	Small, compact, purple, numerous. Dioecious
<b>Ground Ivy</b>  <i>Glechoma hederacea</i>	Perennial. Reproduces by seed. Also by rooting on creeping stems	4-Sided, prostrate. Readily roots at nodes	Fibrous	Round to kidney-shaped. Borne on short petiole. Minty odor, bright-green, opposite	Borne in axil of leaves. Bluish-purple, trumpet-shaped flowers.
<b>Buckhorn Plantain</b>  <i>Plantago lanceolata</i>	Perennial. Reproduces by seed and shoots from roots	Crown type	Fibrous, shallow, tough, slender	As basal rosette. Narrowly oblong, lanceolate. Strong longitude veins	Short, dense, egg-shaped spike borne on long, slender, erect flower stalk
<b>Blackseed Plantain</b>  <i>Plantago rugelii</i>	Perennial. Reproduces by seed	Crown type, shallow	Fibrous, dense	As basal rosette. Broad, egg-shaped on long petioles. Strongly ribbed with 5-7 longitude veins decumbent to erect	Erect, cylindrical spike on long, slender, erect stalk
<b>Curly Dock</b>  <i>Rumex crispus</i>	Perennial. Reproduces by seed	Crown type under mowing.	Fleshy taproot	Simple, smooth, lanceolate, glabrous	Whorled, dense clusters at tip of stem. Seldom observed in maintained turf
<b>Dandelion</b>  <i>Taraxacum officinale</i>	Perennial. Reproduces by seed	Crown type, underground	Deep, fleshy, thick taproot	As basal rosette. Deeply notched to almost smooth. Notches point towards base. Milky juice	Yellow ray flowers borne on long, hairy, hollow stalk with milky juice
<b>White Clover</b>  <i>Trifolium repens</i>	Perennial. Reproduces by seed and stoloniferous stems	Decumbent, glabrous, roots at nodes	Fibrous	Trifoliate, broad elliptical to ovate, leaflets sessile to petiole	White with pinkish cast. Globular heads borne on long stalks from basal nodes
<b>Wild Violet</b>  <i>Viola papilionacea</i>	Perennial. Reproduces by seed	Crown type, can sprout from strong rootstalks	Fibrous, but with larger rootstalks	Heart-shaped with regularly lobed edges. Irregular surface	Deep blue to purple. Single five-lobed flowers born at end of long stalk from basal node.

## Perennial Broadleaf Weeds

Figure includes recommended timing of herbicide application for best control.



**White Clover**  
*Trifolium repens*  
Fall



**Dandelion**  
*Taraxacum officinale*  
Late spring or fall



**Wild Violet**  
*Viola papilionacea*  
Spring or fall



**Blackseed Plantain**  
*Plantago rugelii*  
Fall



**Buckhorn Plantain**  
*Plantago lanceolata*  
Fall



**Canada Thistle**  
*Cirsium arvense*  
Fall



**Mouse ear Chickweed**  
*Cerastium vulgatum*  
Fall



**Curly Dock**  
*Rumex crispus*  
Fall



**Ground Ivy**  
*Glechoma hederacea*  
Spring or fall

# Perennial Broadleaf Weeds

Figure includes recommended timing of herbicide application for best control.



**Bull Thistle**  
*Cirsium vulgare*  
Fall



**Chicory**  
*Chicorium intybus*  
Spring



**Field Bindweed**  
*Convolvulus arvensis*  
Early summer



**Creeping Speedwell**  
*Veronica filiformis*  
Fall



**Indian Mock-Strawberry**  
*Duchesnea indica*



**Yarrow**  
*Achillea millefolium*  
Late spring to midsummer



**Wild Carrot (B)**  
*Daucus carota*  
Spring or Fall



**Red Clover**  
*Trifolium pratense*  
Fall



**Birdsfoot trefoil**  
*Lotus corniculatus*  
Fall

**2022**

## **Cool Season Turf Herbicides**

### **Preemergence**

#### **Benzamide**

Isoxaben (Gallery) - Broadleaf weed control

#### **Benzofurane**

Ethofumasate (Prograss) - Controls *P.annua*, other weeds

#### **Chloracetamide**

Dimethenamid-p (Tower) - Controls goosegrass

#### **Dicarboxamide**

Flumioxazin (Sure Power) – also postemergence

#### **Dinitroaniline**

Benefin (Balan, LESCO Benefin 2.5G)

Pendimethalin (Pendulum, LESCO Pre-M, PROTURF)

Prodiamine (Barricade)

Trifluralin (Team) - Combination product with Benefin

#### **Natural Product**

Dipeptides (Corn Gluten Meal)

#### **Substituted Urea**

Siduron (Tupersan) - Safe on seedling turf. Consult label

#### **Phosphorodithioate**

Bensulide (Betasan, Bensumec, Lescosan) - Controls *P.annua*, others

#### **Oxadiazole**

Oxadiazon (Chipco Ronstar) - Controls goosegrass and other weeds

#### **Pyridine**

Dithiopyr (Dimension) - Pre + Postemergence (1-2 leaf crabgrass)

### **Postemergence Grass / Sedge**

#### **Arsenical**

MSMA

#### **Aryloxyphenoxy propionate**

Fenoxaprop (Acclaim)

#### **Benzothiodiazole**

Bentazon (Basagran T/O, LESCOGRAN) - Contact, Nutsedge Control

#### **Benzoylpyrazole**

Topramazone (Pylex)

#### **Benzyl ether**

Methiozolin (PoaCure)

#### **Pyrimidanyloxy Benzoic**

Byspyribac-sodium (Velocity)

#### **Quinoline carboxylic acid**

Quinclorac (Drive) – Also effective on dandelion, clover

## **Sulfonylurea**

Chlorsulfuron (Corsair) - Tall Fescue control  
Halosulfuron-methyl (Sedgehammer) - Nutsedge control  
Imazosulfuron (Celero) – Nutsedge control  
Pyrimisulfan (Vexis) – Granular nutsedge/Kyllinga control  
Sulfosulfuron (Certainty) - Controls sedge/rough bluegrass, not for cool season turf

## **Triazolinone**

Amicarbazone (Xonerate) – *Poa annua* control

## **Triketone**

Meostrione (Tenacity) - Pre+ Post on grasses and broadleaves, safe on seedling turf

## **Postemergence Broadleaf**

### **Aryl triazinone**

Carfentrazone (Quicksilver) – safe on seedling turf  
Sulfentrazone (Dismiss) – sedge and broadleaves, contact

### **Benzoic Acid**

Dicamba (Banvel)

### **Nitrile**

Bromoxynil (Buctril) - Safe to seedlings of certain turf species and cultivars.

### **N-phenylphthalimide**

Flumioxazin (SurePower)

### **Phenylpyrazole**

Pyraflufen-ethyl (Octane) - contact

### **Phenoxy – carboxylic Acid**

2,4-D - good activity on dandelion  
2,4-DP  
MCPA - in “2,4-D free” formulations  
MCPP - good activity on clover

### **Pyridine – carboxylic Acid**

Clopyralid (Lantrel, Confront) – not for residential use  
Fluroxypyr (Spotlight) – not for residential use  
Triclopyr (Turflon)  
Halauxifen-methyl (GameOn, Relzar)

### **Triazolopyrimidine**

Florasulam (Defendor)  
Penoxsulam (Lockup)

## **Non-Selective**

### **Bipyridilium [D<sup>(22)</sup> Photosystem I inhibitors]**

Diquat (Reward) – Contact

### **Glycine [G<sup>(9)</sup> Enolpyruvyl Shikimate-3-phosphate (EPSP) synthase inhibitor]**

Glyphosate (Roundup) – 1-2 Week Burn Down, Systemic

### **Organophosphorus [H<sup>(10)</sup> Glutamine synthetase inhibitor]**

Glufosinate (Finale) - 4 Day Burn Down, Contact

### **Soaps**

Pelargonic acid (Scythe) – Contact



# Broadleaf Herbicide Phenoxy and Pyridinoxy Combination Products

Products	2,4-D	2,4-DP	MCPA	MCPP	Dicamba	Clopyralid	Fluroxypyr	Quinclorac	Triclopyr	Carfentrazone	Sulfentrazone	Pyrflufen	Florasulam	Flumioxazin	Halauexifen
Formula 40, Dymec, Weedone LV4, Weedar 64, LESCO A-4D, Weedestroy AM-40, Opti-Amine, Hardball, Barrage HF															
MCPP 4-Amine, Turfgro MCPP 4K, Mecomec 2.5, Mecomec 4															
2 Plus 2															
Banvel, Diablo, Vanquish															
Four-Power Plus, Super D Weedone															
Trimec Classic, Trimec 899, Trimec 992, Trimec LAF-637, Strike 3, Three Way Selective, Trimec Bent, Bent Selective, Triplet WS, Triplet SF, Trexsan, Mec-Amine-D, Mec Amine-BG, Trimec Plus, 3-D															
Triad															
MCPA 4-Amine															
Tri-Power, Trimec Encore															
Weedone DPC, Turf D-DP															
Trimec Turf Ester, Super Trimec, Brushmaster															
Three Way Ester, Tri-ester, Tri-amine, Dissolve, Spoiler															
Tri-ester II, Tri-amine II															
Turflon Ester Ultra, Triclopyr 4															
Chaser, Chaser 2, Turflon II amine															
Cool Power, Horsepower, Three-Way Ester II, Eliminate															
Lontrel															
Chaser Ultra															
Confront, 2-D															
Momentum															
Battleship															
Millenium Ultra 2, Millenium Ultra Plus															
Spotlight															
Chaser Ultra 2															
Tailspin															
Battleship III															
Change Up															
Last Call (also contains fenoxaprop)															
Momentum FX, Momentum FX2															
Escalade 2															
Strike Three Ultra 3															
Drive, Drive XLR8, Quinclorac 75 DF, QuinPro, Eject 75DF															
Onetime															
Quincept, 2DQ															
Defendor															
<b>GameOn</b>															
<b>Relzar (Registration Pending)</b>															
<b>Switchblade (Registration Pending)</b>															
<b>Sure Power</b>															

Note: Not all products listed are still currently for sale. Mention of trade name is for example only and does not constitute endorsement over other products which may be similar. Products in **bold** are newer releases.

## Broadleaf Herbicides Protox Inhibitor and other Combination Products

Products	2,4-D	2,4-DP	MCPA	MCPP	Dicamba	Clopyralid	Fluroxypyr	Quinclorac	Triclopyr	Carfentrazone	Sulfentrazone	Pyraflufen	Florasulam	Flumioxazin	Halauexifen
Quicksilver, Quicksilver T & O															
Shutout															
Speedzone															
Powerzone															
Redzone															
<b>Triad SFZ Select</b>															
Dismiss															
<b>Dismiss NXT</b>															
Surge, SureZone															
Q4, Q4 Plus															
<b>Momentum 4-Score</b>															
Octane															
Solitare															
4 Speed, Redzone 2															
4 Speed XT															
T-Zone, <b>Foundation</b>															

Note: Not all products listed are still currently for sale. Mention of trade name is for example only and does not constitute endorsement over other products which may be similar. Products in **bold** are newer releases.

## Points to Consider When Using Synthetic Herbicides

1. --Control annual grasses preemergence in late winter / early spring.
  - Apply products uniformly
 --To control annual grasses postemergence:
  - Apply herbicides while weeds are young (before tillering)
  - Use caution when controlling annual grasses with postemergence Herbicides. Do not apply to stressed turf.
 --Control most perennial grasses with non-selective herbicides.
  - Selective herbicides are available for tall fescue, creeping bentgrass, and rough bluegrass control in cool season turfgrass
 --Control annual broadleaves preemergence or early postemergence
  - Selective herbicides are available for tall fescue, creeping bentgrass, and rough bluegrass control in cool season turfgrass
 --Control perennial broadleaf weeds postemergence in fall:
  - For annuals or perennials, use combination products when more than one difficult to control weed species is present.
2. Rotate among modes of action of herbicides, not just between chemicals or chemical classes.
3. If using an extension research report to make selection, use average results over a period of years, not from one year only.
4. **Always read label prior to use.**

NOTE: Trade name listed is for example only and does not constitute product endorsement. Several of the materials are marketed under more than one trade name

# Herbicides for Grassy Weed Control

Weed Species	Preemergence												Postemergence								
	Bensulide	Dimethenamid-p	Ethofumesate	Benefin	Pendimethalin	Prodiamine	Dithiopyr <sup>1</sup>	Siduron	Oxadiazon	Dipeptides	Mesotrione <sup>2</sup>	Topramazone <sup>2</sup>	Amicarbazone	Fenoxaprop	Quinclorac	Byspyribac	Chlorsulfuron	Halosulfuron	Bentazon	Sulfentrazone	Glyphosate
	<b>Summer Annual Grassy Weeds</b>																				
Barnyardgrass	✓		✓	✓	✓	✓	✓		✓				✓	✓							
Crabgrass (Large)	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
Crabgrass (Smooth)	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
Dallisgrass							✓					✓	✓								
Goosegrass		✓		✓			✓				✓	✓		✓							
Green Foxtail	✓		✓	✓	✓	✓	✓	✓						✓	✓						
Johnsongrass						✓								✓							
Lovegrass						✓															
Witchgrass						✓															
Yellow Foxtail	✓		✓	✓	✓	✓	✓	✓			✓			✓	✓						
<b>Winter Annual Grassy Weeds</b>																					
Annual Bluegrass	✓		✓	✓	✓	✓	✓		✓				✓			✓					
Downy Brome							✓	✓													
<b>Perennial Grassy Weeds</b>																					
Nimblewill											✓	✓									✓
Orchardgrass											✓										✓
Quackgrass																					✓
Rough bluegrass																					✓
Smooth Brome																					✓
Timothy																					✓
<b>Weedy Turfgrasses</b>																					
Bermudagrass																					✓
Creeping bentgrass											✓										✓
Perennial ryegrass																✓					✓
Tall fescue																✓					✓
<b>Sedge</b>																					
Yellow Nutsedge		✓									✓						✓	✓	✓		

<sup>1</sup> Dithiopyr also has early postemergence activity on crabgrass  
<sup>2</sup> Can be used pre- or post-emergence against annual grasses and sedges, and post- against perennial grasses.

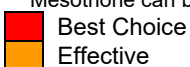
Best Choice  
 Effective

# Recommended Herbicides<sup>1</sup> for Broadleaf Weed Control

Weed Species	Preemergence								Postemergence													
	Bensulide	Ethofumesate	Benefin	Pendimethalin	Prodiamine	Dithiopyr	Siduron	Oxadiazon	Isoxaben	Mesotrione <sup>2</sup>	2,4-D	2,4-DP	MCPA	MCPP	Dicamba	Clopyralid	Fluroxypyr	Triclopyr	Quinclorac	Carfentrazone	Sulfentrazone	Pyraflufen
<b>Summer Annual Broadleaf Weeds</b>																						
Black Medic															✓	✓	✓	✓		✓		
Carpetweed					✓	✓				✓					✓	✓						
Common Mallow															✓	✓	✓					
Corn Speedwell			✓	✓		✓		✓								✓						
Knotweed				✓	✓	✓			✓						✓	✓						
Lambsquarters	✓				✓				✓													
Oxalis (Yellow Woodsorrel)				✓	✓	✓		✓	✓	a	a				b		b					
Pigweed					✓	✓		✓	✓	✓	✓			✓								
Pineappleweed						✓									✓							
Prostrate Spurge				✓	✓	✓		✓	✓	✓	✓			✓	✓							
Purslane		✓		✓	✓	✓		✓	✓	✓					✓							
Virginia Pepperweed										a				a	a							
<b>Winter Annual Broadleaf Weeds</b>																						
Common Chickweed		✓	✓	✓		✓			✓					✓	✓							
Common Groundsel								✓		a				a	a							
Henbit	✓		✓	✓	✓	✓			✓						✓			✓				
Prickly Lettuce										a				a	a							
Shepard's Purse	✓				✓	✓			✓													
Sowthistle (Annual)									✓						✓							
<b>Biennial and Perennial Broadleaf Weeds</b>																						
Birdsfoot trefoil														✓		✓	✓					
Blackseed Plantain										✓				✓		✓		✓				
Buckhorn Plantain										✓				✓		✓		✓				
Bull Thistle															✓	✓						
Canada Thistle										✓					✓	✓						
Chicory															✓							
Creeping Speedwell (Veronica)										✓				✓					✓			
Curly Dock										✓				✓	✓							
Dandelion									✓	✓		✓			✓			✓	✓	✓	✓	
Field Bindweed																			✓			
Ground Ivy (Creeping Charlie)															✓			✓				✓
Indian Mock Strawberry										a				a	a							
Mouse-ear Chickweed														✓	✓	✓						
Red Clover														✓		✓	✓					
White Clover									✓					✓	✓	✓	✓		✓			
Wild Carrot										a				a	a							
Wild Violet															✓	✓		✓				
Yarrow															✓							

<sup>1</sup> Where the recommendation is denoted by a letter, the combination of herbicides with the same letter is recommended.

<sup>2</sup> Mesotrione can be used pre- or post-emergence against annual and perennial broadleaves.



Classification of herbicides registered for use in cool season turfgrass according to both the former Herbicide Resistance Action Committee (HRAC) and the Current Mechanisms of action codes according to both the HRAC and the Weed Science Society of America (WSSA). A proper herbicide rotation involves changing between not just products or chemical classes, but modes of action.

<b>Preemergence</b>			
<b>WSSA/HRAC (former HRAC) codes and mode of action</b>	<b>Chemical Class</b>	<b>Common Name</b>	<b>Example Trade Name</b>
0(Z) Unknown	Phosphorodithioate	Bensulide	Betasan, Bensumec, Lescosan
3(K1) Mitosis inhibitors	Dinitroaniline Dinitroaniline Dinitroaniline Pyridine	Benfenin Pendimethalin Prodiamine Dithiopyr	Balan, LESCO Benfenin 2.5G Pendulum, LESCO Pre-M Barricade Dimension
14(E) Protoporphyrinogen Oxidase (PPO or Protox) inhibitor	Oxadiazole	Oxadiazon	Chipco Ronstar
15(K3) Very long chain fatty acid biosynthesis inhibitors	Chloracetamide Benzofuran	Dimethenamid-p Ethofumasate	Tower Prograss
29(L) Cellulose inhibitors	Benzamide	Isoxaben	Gallery

<b>Postemergence Grass</b>			
1(A) Acetyl CoA Carboxylase (ACCase) Inhibitors	Aryloxyphenoxy propionate	Fenoxaprop	Acclaim
2(B) Acetolactate Synthase (ALS) inhibitor	Pyrimidanyloxy Benzoates  Sulfonylurea Sulfonylurea	Byspyribac-sodium  Chlorsulfuron Halosulfuron-methyl	Velocity  Corsair Sedgehammer
4(O) Auxin mimics	Quinoline carboxylic acid	Quinclorac	Drive
6(C3) Photosystem II inhibitor – Histidine 215	Benzothiodiazole	Bentazon	Basagran T/O, LESCOGRAN
15(C1) Photosystem II inhibitor – Serine 264	Triazolinone	Amicarbazone	Xonerate
27(F2) 4-Hydroxyphenylpyruvate Dioxygenase (HPPD) Inhibitors	Benzoylpyrazole Triketone	Topramazone Meostrione	Pylex Tenacity
30(Q) Inhibition of fatty acid thioesterase	Benzyl ether	Methiozolin	PoaCure

<b>Postemergence Broadleaf</b>			
2(B) Acetolactate Synthase (ALS) inhibitor	Triazolopyrimidine-Type 1 Triazolopyrimidine-Type 2	Florasulam Penoxsulam	Defendor Lockup
4(O) Synthetic Auxins	Benzoates Phenoxy – carboxylates Phenoxy – carboxylates Phenoxy – carboxylates Phenoxy – carboxylates Pyridine – carboxylates Pyridine – carboxylates Pyridyloxy – carboxylic Acid Pyridyloxy – carboxylic Acid	Dicamba 2,4-D 2,4-DP MCPA MCP Clopyralid Halauxifen Fluroxypyr Triclopyr	Banvel     Lontrel, Confront Game-on  Turflon
14(E) Protoporphyrinogen Oxidase (PPO or Protox) inhibitor	N-phenyl-triazolinone N-phenyl-triazolinone Phenylpyrazole	Carfentrazone Sulfentrazone Pyraflufen-ethyl	Quicksilver Dismiss Octane

## Turf Tolerances to Preemergence Herbicides

Products	Kentucky bluegrass	Perennial ryegrass	Tall Fescue	Fine Fescue	Creeping Bentgrass	Bermudagrass	Zoysiagrass	St. Augustinegrass	Centipedegrass
Bensulide (Betasan, Bensumec, Lescosan) - Controls <i>P.annua</i> , others	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dimethenamide-p (Tower) – controls goosegrass, safe on greens	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ethofumasate (Prograss) - Controls <i>P.annua</i> , other weeds	✓	✓	✓		‡	†		✓	
Benefin (Balan, LESCO Benefin 2.5G)	✓	✓	✓	✓		✓	✓	✓	✓
Oryzalin (Surflan, XL – combination with benefin)			✓			✓	✓	✓	✓
Pendimethalin (Pendulum, LESCO Pre-M, PROTURF)	✓	✓	✓	✓		✓	✓	✓	✓
Prodiamine (Barricade)	✓	✓	✓	✓	‡	✓	✓	✓	✓
Trifluralin (Team) - Combination product with Benefin	✓	✓	✓	✓	‡	✓	✓	✓	✓
Dipeptides (Corn Gluten Meal)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Siduron (Tupersan) - Safe to turfgrass seedlings. Consult label	✓	✓	✓	✓	§				
Oxadiazon (Chipco Ronstar) - Controls goosegrass and other weeds	✓	✓	✓			✓	✓	✓	
Dithiopyr (Dimension) - Pre + Post-emergence	✓	✓	✓	✓	¶	✓	✓	✓	✓
Isoxaben (Gallery) - Broadleaf weed control	✓	✓	✓	✓	‡	✓	✓	✓	✓
Atrazine						✓	✓	✓	✓
Simazine (Princep)						✓	✓	✓	✓
Metribuzin (Sneacor)						✓			
Metolachlor (Pennant)						✓	✓	✓	✓
Napropamide (Devrinol)						✓	✓	✓	✓

† Dormant bermudagrass only. Consult label for specifics.

‡ Fairway and tees height bentgrass only. Consult label for specifics.

§ Seaside, Highland, Astoria, and C-7 creeping bentgrass only. Consult label for specifics.

¶ Use restrictions on putting greens vary among formulations. Consult label for specifics.